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# Republic of Yemen Enhancing Policy Options

## A Population Sector Study

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## CURRENCY EQUIVALENTS

Currency Unit = Yemeni Rial (YR)

YR 1 = 100 FILS

## EXCHANGE RATE AS OF DECEMBER, 1996

YR 115 = US\$1

## YEMEN FISCAL YEAR

January 1 - December 31

## LIST OF ACRONYMS

AET	Adult Education and Training Centers
ANC	Antenatal Care
CSO	Central Statistical Organization
DHC	District Health Council
FP	Family Planning
GDP	Gross Domestic Product
GNP	Gross National Product
IDA	International Development Association
IEC	Information, Education and Communications
IMR	Infant Mortality Rate
IPPF	International Planned Parenthood Federation
MCH	Maternal and Child Health
MMR	Maternal Mortality Ratio
MOE	Ministry of Education
MOI	Ministry of Information
MOPD	Ministry of Planning and Development
MOPH	Ministry of Public Health
MOSA	Ministry of Social Affairs
NGO	Nongovernmental Organization
NPC	National Population Council
ORT	Oral Rehydration Therapy
PHC	Primary Health Care
SFD	Social Fund for Development
STD	Sexually Transmitted Diseases
UNICEF	United Nations Children's Fund
UNFPA	United Nations Population Fund
TFR	Total Fertility Rate
VTE	Vocational and Technical Education
WHO	World Health Organization
YDMCHS	Yemen Demographic and Maternal and Child Health Survey, 1991/1992
YFCA	Yemen Family Care Association
YR	Yemeni Rial

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# REPUBLIC OF YEMEN

## Enhancing Policy Options A Population Sector Study

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This report is based on the findings of a mission which visited Yemen between October 25 and November 23, 1996. The mission members were: Egbe Osifo and David Steel (Co Task Managers), Bahjat Achikbache (Senior Statistician), Atsuko Aoyama (Health Specialist), Takatoshi Kamezawa (Education Specialist), Rekha Menon (Health Economist), Sharon Beatty, Eduard Jongstra, Carel van Mels and Henk Rolink (Consultants). The study was prepared in collaboration with the National Population Council Technical Secretariat (NPC/TS). The NPC/TS staff and advisers included: Mr. Amin Al Janad (Assistant Secretary-General), Dr. Hussein Shakhathreh (Chief Technical Adviser) Mr. Abdul Malik Shihamy, Dr. Nageia Bahobeshi (Reproductive Health adviser) and Messrs. Abd Rajam A. Safi, Motahar Zabara, Yahya Al Hifi, Mojahed Al Shape and Hussein AbdoTaleb. The mission and the NPC/TS wish to acknowledge the generous provision of a grant towards the costs of preparing this report by the Embassy of the Netherlands in Yemen. The report was formatted by Iqbal Kaur, MNSHD. The Sector Director is Mr. Jacques Baudouy and the Country Director is Inder Sud.



## EXECUTIVE SUMMARY

### INTRODUCTION

1. The *Yemen Population Sector Study*, prepared by the World Bank in collaboration with the National Population Council (NPC) of the Government of Yemen, has two objectives: to help senior policy makers assess the implications of rapid population growth, and to identify intervention strategies and programs to slow population growth and manage its consequences.

2. The report suggests three strategic measures the Government can take to accelerate the demographic transition while improving its population management policies: (a) deliver a comprehensive health package including reproductive health for women and children; (b) expand girls educational opportunities using a community-based approach; and (c) strengthen social programs to complement the first two measures.

3. The Republic of Yemen, a low-income country, has a population of 15.2 million growing at 3.7 percent a year.<sup>1</sup> If the present growth rate remains, the population will double in less than twenty years. In addition to one of the fastest growing populations in the world, Yemen's is also one of the least healthy. Its Total Fertility Rate (7.4 births per woman) and Infant Mortality Rate (93 deaths per 1,000 live births) are the highest in the Middle East and North Africa; its female primary school enrollment rate (37 percent) and life expectancy at birth (57 years) are the lowest.

4. Yemen's population issues are not limited to rapid growth. Because the number of women entering their childbearing years is increasing, the population will continue to increase rapidly, with significant implications for financing and provision of education, health and other social services. Because the population is very "young" (half are under 15), pressure for employment opportunities will be strong and age dependency ratios high. Because rural populations are expanding beyond the absorptive capacity of the agricultural economy, urbanization is increasing at 7 percent per year. Finally, if annually renewed

water resources remain constant until 2020 and the population grows at the high case scenario of the Central Statistics Office (CSO), per capita water availability would drop nearly to the minimum level necessary to fill basic human needs.

### REDUCING POPULATION GROWTH IS BENEFICIAL

5. Reducing fertility would have positive welfare implications: infant and maternal mortality rates would fall and life expectancy increase. The poor, because of their higher fertility and mortality rates, are expected to benefit significantly.

6. Macroeconomic policies are enhanced if accompanied by effective population policies. In order for Yemen to achieve a 5 percent economic growth rate per annum, the investment/GDP ratio would have to double by the year 2000. At the national level, rapid population growth imposes high demands for current consumption and so constrains resources available for investment. At the household level, reducing fertility may reduce expenditures on basic requirements, thus enabling savings and capital formation.

7. In the absence of significant investment to modernize agriculture or diversify the economy, continuing high population growth is likely to lead more households into poverty and more of the poor to the cities. Most of the poor live in rural areas and depend on agriculture. Because there is little or no unused arable land for increasing production by extending cultivation, reducing rural poverty and urbanization will depend in part on reducing population growth.

8. The costs of growth are cumulative. The more numerous the population, the more difficult the task of curbing its growth and managing its effects. Each cohort of female children is a group of future mothers; as cohorts become successively larger, the size of each implies the next will be still larger. This is known as *population momentum*. Inaction today thus makes reducing population growth more difficult in the future.

## POPULATION GROWTH CAN BE REDUCED THROUGH A POPULATION ACTION PROGRAM

9. The report describes and analyzes the impact of a model set of interventions which could be implemented through a *Population Action Program* aimed at:

- Reducing the demand for children and weakening population momentum by stepping up the pace of health, education and social programs; and
- Enabling families to achieve their ideal family size by improving reproductive health programs.

10. The *Population Action Program* consists of costed intervention packages for health, education, and social development. It is designed to give specific program content to the goals adopted for the new National Population Strategy and Action Plan adopted at the Second National Population Conference in October, 1996. The *Program* consists of the following interventions:

- (i) *In health*: A comprehensive health package including a reproductive health program with family planning, and basic health and nutrition components. The package is designed to achieve targeted reductions in maternal, infant and child mortality and morbidity and to lower fertility by encouraging birth spacing.
- (ii) *In education*: Expansion of community-based basic education for girls in rural areas to complement planned expansion of the public education system. The program's objective is to increase access to basic education and improve retention rates for girls and thus contribute to lower fertility rates and lower fertility through encouraging the use of birth spacing.
- (iii) *In social programs*: Expansion of population advocacy, awareness and information programs, to decrease desired family size and to encourage community provision of welfare and social services.

## BENEFITS OF A POPULATION ACTION PROGRAM

11. The benefits to be gained from implementing the *Population Action Program* can best be seen through comparing expected outcomes in 2020 with present trends. What would the *Program* yield?

- a population with about 7 million fewer persons than expected under the CSO high growth scenario;
- a total fertility rate of 3.1 in 2020, compared to 7.4 in 1995;
- a 46 percent reduction in maternal deaths to 150,000; if current trends prevail, there will be 280,000 maternal deaths in 2020;
- a decrease in the infant mortality rate to about 58 per 1000 from the present 93 per 1000;
- a girls' enrollment rate in primary schools of about 87 percent by 2020 instead of the present rate of about 35 percent;
- total public expenditure savings in health and education alone of about US\$1.4 billion. Substantial expected additional savings (other public investment, food imports, private savings) have not been quantified in this report.

## FEASIBILITY AND SUSTAINABILITY OF A POPULATION ACTION PROGRAM

12. The report examines the financial and institutional sustainability of the *Population Action Program*. Total program costs would amount to 1.5 percent of GDP in 2020 and 4.4 percent of total government spending in 2020, assuming constant GDP growth at 5 percent a year until 2020, total public expenditure at 35.5 percent of GDP, public health expenditure at 2.6 percent of GDP, and public education expenditure at 6.4 percent of GDP until 2020.<sup>2</sup>

13. Total expenditures required to implement the *Population Action Program* would be about US\$2.5 billion through 2020. Seventy-five percent of spending would be in health, reflecting

previous under-investment in the sector. The budgetary impact of the proposed education and social programs is not financially significant. The cost of the health activities proposed would be about 25 percent of the health budget in 2000 and about 45 percent in 2020, reflecting the projected low public spending on health. Increased donor assistance in addition to increased government expenditures and private investment would be required to make the health component of the program sustainable.

14. Four conditions are necessary to help ensure the feasibility and sustainability of the *Population Action Program*.

15. Sustained economic growth. If GDP grows at an annual rate of 3 percent instead of the 5 percent assumed for costing purposes, the cost of the total program would be about 7.5 percent of total public expenditures in 2020 instead of the 4.4 percent predicted. This illustrates the importance of the macroeconomic reform program for achieving and maintaining social development in addition to sustained economic growth.

16. Clear institutional framework. Given the overall lack of management capacity in Yemen and the underdeveloped state of NGOs, donors will have to devote significant time and funding to supporting capacity development and systems strengthening in both the public and private sectors (Annex 5). Establishment of an institutional framework which both makes the responsibilities of all agencies clear and provides incentives for the performance of these responsibilities is essential. The report suggests that NPC should remain responsible for sectoral leadership, population policy and planning, overall monitoring and evaluation and interministerial coordination. Implementation should be the responsibility of the other government agencies, including the Ministry of Public Health (MOPH), Ministry of Education (MOE), Ministry of Social Affairs (MOSA) and Ministry of Information (MOI). The proposed Social Fund for Development, working in cooperation with local organizations, would be an effective

complementary institution for implementation, capacity building and channeling donor funds.

17. A broad based partnership for implementation. The program is only sustainable in financial and institutional terms if communities, domestic and international NGOs and new kinds of organizations such as the proposed Social Fund for Development can assume a substantial implementation role in partnership with the Government. Multi- and bilateral donor financing is essential to existing population programs; support of this kind for the proposed *Population Action Program* will also be indispensable. The World Bank stands prepared to assist the Government of Yemen in implementing this program.

18. Leadership. Above all, the proposed program will require determined and sustained leadership from the highest authorities in Yemen. There are signs of awareness and change already. Combined with the proposed improvements and interventions, this leadership would do much to improve the standard of living and the quality of life for all Yemeni citizens, the key goal of the 1996 National plan of Action.

19. The World Bank is prepared to give this program high priority in its Country Assistance Strategy for Yemen if the Government is interested in pursuing this program. The report recommends that the Government gather the donor community to review the program and to reach agreement on donor support for its implementation. The upcoming consultative group meeting could provide an optimum opportunity for this discussion. If the Government is interested, the World Bank is ready to assist it in this undertaking.



## 1. INTRODUCTION AND BACKGROUND

1.1 The purpose of this study is to help senior policy makers in the Government of Yemen assess better the implications of high fertility and rapid population growth for socio-economic development and to suggest appropriate intervention strategies. It describes the present demographic situation in Yemen, reviews the determinants of fertility and the effects of high

enrollment rate (37 percent), and the lowest life the highest Total Fertility Rate (TFR) (7.4 births per woman), the highest Infant expectancy at birth (57 years) for indicator comparisons (Table 1).

*... with slow economic growth*

1.3 Following a series of events in the 1990s,

**Table 1: Demographic, social and economic indicators for Yemen and selected low and middle income countries (most recent estimates, from 1989 -1994)**

Country	Yemen	Egypt	Iran	Jordan	Morocco	Kenya	Indonesia
GNP per capita (US\$)	280	710	2200	1390	1150	250	880
TFR	7.4	3.5	4.7	4.8	3.5	4.9	2.7
IMR	93	52	47	32	56	59	53
Female Primary School Enrollment Ratio %	37	89	101	95	60	91	112
Annual Freshwater Withdrawal 1970-1992 (as % of total water resources)	136	97	39	32	36	4	1

population growth and estimates the cumulative impact on fertility reduction of costed intervention packages. This report was developed, in a participatory manner, with the Technical Secretariat of the National Population Council and several key participants at the recent Second National Population Conference in October 1996. It complements earlier work carried out by the World Bank in Yemen such as the Poverty Assessment, Public Expenditure Review, Towards a Water Strategy and Policy Notes in Health, Education and Gender Issues. It is based on a series of technical working papers which are available in the annex to this report. The topic of these papers include demography, reproductive health programs, and population action programs.

### *Yemen has a rapidly growing population*

1.2 The Republic of Yemen is a low-income country with a population of 15.2 million.<sup>3</sup> The Yemeni population, growing at 3.7 percent per annum<sup>3</sup>, is one of the fastest growing populations in Mortality Rate (IMR) (93 deaths per 1,000 live births)<sup>4</sup>, the lowest female primary school world. Among the countries in the region, Yemen has the

including unification, the Gulf War, the loss of external aid and the 1994 civil war, the economy faltered. Between 1990 and 1994, these factors caused slow economic growth (3 percent per annum), high inflation (58 percent) and a budget deficit (14 percent of Gross Domestic Product (GDP) in 1994). The Government has taken steps to stabilize the macroeconomic situation by implementing a structural reform program. The fiscal deficit has fallen from 14 percent of GDP in 1994 to 8 percent of GDP in 1995.

### *Rapid population growth will have serious consequences for Yemen*

1.4 Rapid population growth is a severe problem in Yemen. According to CSO (Central Statistical Organization) estimates, the population of Yemen will double in the next twenty years unless effective population policies are introduced. Rapid population growth due to high fertility rates will have negative welfare implications through increased infant and maternal mortality rates, and shorter life expectancies. The poor, because of their higher fertility and mortality rates,<sup>5</sup> will suffer disproportionately. In addition, the impact

of macroeconomic and sectoral policies will be greatly reduced. Yemen is a water-scarce country. Its current available water amounts to a little over 134 cubic meters per capita each year. Demographic pressures will increase the demand for water and for products whose production require water putting an intense strain on natural resources.

1.5 Fast population growth exacerbates the choice between current consumption and investment for future generations. Therefore, if a country's resources are inadequate to meet current consumption needs, resources available for future investments are severely limited. Investment as a percentage of GDP in Yemen was 10.1 percent in 1995. In order to achieve a modest 4.8 percent economic growth per annum, the investment/GDP ratio would have to double by the year 2000.<sup>6</sup> At the household level, high fertility increases expenditures for basic requirements (education, health, food and clothing) and acts as a disincentive to saving and capital formation. An additional advantage of reducing population growth is related to the associated fall in youth dependency rates. Reduced dependency rates have been associated in cross-national studies with higher national and household savings, and reduced current account savings over time.<sup>7</sup>

1.6 Poverty is widespread in Yemen, affecting one out of every five persons. It is primarily a rural phenomenon as 81 percent of all poor live in rural locations.<sup>1</sup> Most of the rural population is dependent on agriculture and there is often little or no unused arable land available for increasing production through extended cultivation. The number of land holders increased by 66 percent in the last decade while the average size of land holdings has decreased by about 33 percent.<sup>8</sup> In the absence of significant investment to modernize agriculture or diversify the economy, continuing high population growth is likely to lead more households into poverty.

*... so it is necessary to act now*

1.7 The costs of rapid population growth are cumulative. As the number of births increases, the

task of curbing population growth in the future becomes increasingly difficult. Inaction today reduces the options available for reducing population in the future. The political leadership faces several fundamental choices as it decides the appropriate development strategy to propel Yemeni society into the 21st century. The impact of a rapidly growing young population and its distribution are central to any discourse.

### *The Government has already initiated a National Population Strategy*

1.8 The Government developed and ratified its first National Population Strategy and Action Plan in 1991. In 1992, the National Population Council (NPC) was established with the Prime Minister as Chairman and the Minister of Planning and Development as Deputy Chair. Core members of the NPC include Ministers of Finance, Public Health, Education, Information, Social Affairs, Awquaf (religious affairs), Youth and Sports, Housing and Urban Planning, and the Chairs of the Environmental Protection Council and the Yemen Family Care Association. Although, these steps provide a foundation for addressing the country's population problems, the NPC has had limited success in fulfilling its mandate. However, the situation may be changing as illustrated by the greater success NPC has had in enlisting the support of key policymakers in addressing population issues.

1.9 In 1996, an updated National Plan of Action was drafted at a second National Population Conference for the 1996-2006 period. The plan recognizes population growth as one of the most formidable and intractable problems facing Yemen. It is based on four premises, on which policy interventions are based: (a) health, education and cultural development of individuals are essential to improve productivity and the quality of life; (b) fertility reduction is an individual matter and to be decided within the framework of Islam; (c) sustainable development requires achieving a balance between economic growth and population growth and the adoption of positive incentives to individuals, communities, NGOs and the private sector to participate in the

solution of population related problems; (d) a legislative and institutional framework should be created to assign each level of society and government body with the appropriate responsibility to carry out programs.

1.10 Its population program remains high priority for the Government, and the 1996 plan contains several targets for the year 2006. These targets include reducing the TFR to 5 and raising the contraceptive prevalence rate to 36 percent. These targets are very ambitious and not likely to be achieved. However, they represent an expression of political will to address the issues raised by Yemen's population growth.

*...but population management and improvement of the institutional framework must be a priority*

1.11 In addition, the Government will have to improve its management of population growth, because the population of Yemen will double in about twenty years regardless of interventions to reduce fertility levels. The key management issues which the Government will have to address on a continuing basis include providing an enabling environment that would encourage fostering of employment opportunities for a rapidly growing labor force, the management of water resource allocation and utilization, and the provision of education, health and other social services. While employment and water issues are beyond the scope of this report, they are addressed in other World Bank reports (Towards a Water Strategy, Report No. 15718-YEM, Public Expenditure Review, Report No. 16147-YEM, and Poverty Assessment, Report No. 15158-YEM). Issues concerning gender, health and education in Yemen are more extensively reviewed in the Policy Notes on Health, Education and Gender prepared by the World Bank.

1.12 The weakness of Yemen's institutional environment in the population sector is a major constraint. It is still at a fairly embryonic stage of development and with a few notable exceptions is characterized by serious weaknesses at all levels whether in the public, private or NGO sectors. There is almost no infrastructure at the

Governorate level and there are only about 10 domestic and international NGOs in Yemen with the capacity to deliver programs. In addition the decline in remittances since 1991 appears to have reduced the ability of communities to help themselves.

## 2. DEMOGRAPHIC ANALYSIS AND POPULATION POLICY OPTIONS

### A. Trends in population dynamics

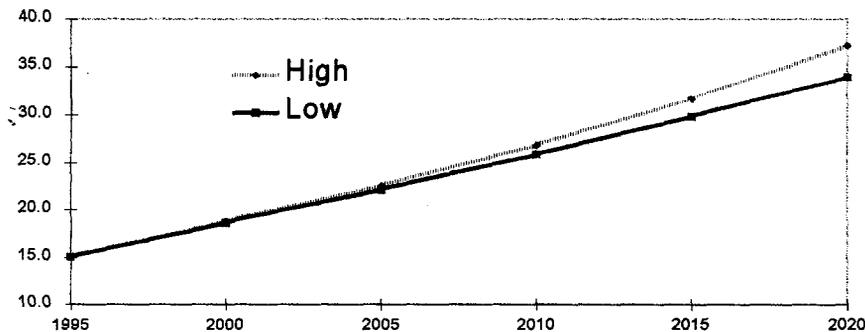
#### *Population is doubling in less than twenty years*

2.1 The Yemeni population more than doubled between 1974 and 1994 from an estimated 7 million<sup>9</sup> to 15.2 million. And if the

*... and will cause some serious problems*

2.2 Yemen's population problems are not limited to rapid growth and include additional aspects of population dynamics. The *population composition* is very "young" (50 percent of the

**Figure 1: Population Projections 1995-2020**



The Central Statistical Organization (CSO) of the Government of Yemen has established nine population projections on the basis of the 1994 Population Census results. Of these, CSO has retained three core projections: High (based on high fertility and low mortality), Medium (medium mortality and fertility), and Low (low fertility and medium mortality) variants; of which only the high and low variants are illustrated in the above graph (see Annex 1 for further details).

Source: Central Statistical Office, Republic of Yemen, 1996.

present annual *natural population growth rate* of 3.7 percent is maintained, the population will double once more in less than 20 years (Figure 1). However, significant regional differences in population growth rates exist; and urban areas have been growing almost twice as fast as rural areas (Table 2). There are also growth rate differences between various governorates which are explained by different fertility levels mortality levels and migration patterns (See Appendix 1)

**Table 2: Average annual population growth rates (including migration)**

Region	1973/75 - 1986/88	1986/88 - 1994
North-West	4.04	4.62
South-East	2.59	3.99
Urban	n.a.	7.03
Rural	n.a.	3.74

Source: Annex 2.

population is under age 15), which results in a high age dependency ratio (1.2). As large numbers of women enter their childbearing years,<sup>10</sup> the population will continue to increase rapidly, even if fertility levels drop significantly, a phenomenon known as *population momentum*.

2.3 *Population distribution* problems include internal migration, especially rural-urban; returning migrants and the associated loss of remittances; and the emergence of under-served squatter areas and poor districts (presently 77 percent of Yemenis live in rural areas, but urban growth is 7 percent per year). This report did not analyze migration issues since they were considered to be outside its scope. However, it was estimated that if present rural-urban migration patterns continued, approximately 36 percent of the population in the year 2020 would be urban (Annex 3). In addition, these aspects of population dynamics, coupled with geographical,

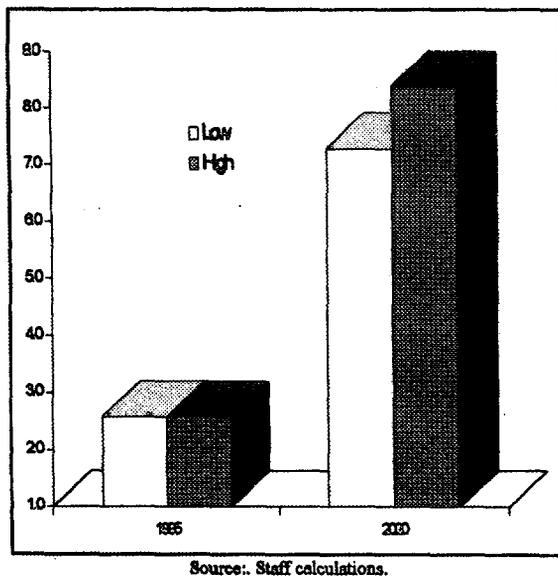
cultural and economic barriers, have implications for the provision of social services and infrastructure, employment, and the environment. The impact of population growth on selected sectors of the economy are illustrated below.<sup>11</sup>

### B. Sectoral impacts

*The number of students enrolled in basic education will increase dramatically*

2.4 Assuming that total gross enrollment in basic education will increase from 64 percent in 1995 to 90 percent in 2020, the number of students who will be enrolled in basic education in 2020 will be 1.1 million students greater under the high population scenario than under the low population growth scenario (Figure 2).

**Figure 2: Projected basic education gross enrollments in 2020**

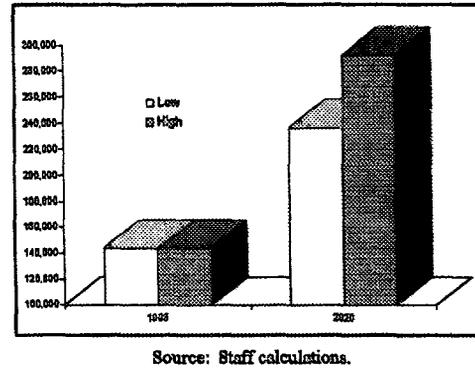


*... and more new jobs will be required*

2.5 Even if it is assumed that the labor force participation rates<sup>12</sup> between the ages of 15 and 64 remain constant, at least 148,000 more new jobs will be required in 2020 under the high population growth scenario. A faster reduction in

fertility (based on the low growth rate scenario) will reduce the number of new jobs required by nearly one-third (Figure 3).

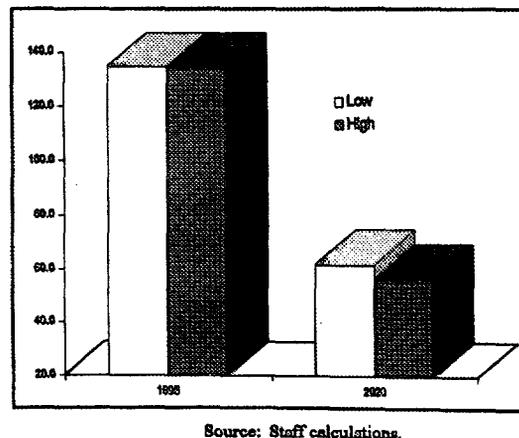
**Figure 3: Estimated number of new jobs required by 2020**



*... while the demand for water will rise*

2.6 Today, Yemen's available water amounts to a little over 134 cubic meters per capita each year compared to the MENA average of 1,250 cubic meters. If Yemen's total annually renewed water resources remain constant over the next 25 years, under the high population growth scenario available water per capita will be reduced to 56 cubic meters per capita (Figure 4). This would barely cover basic human needs which are estimated to range between 40- 80 cubic meters per capita per year.<sup>13</sup>

**Figure 4: Estimated annual water resources available per capita in 2020**



### C. Fertility determinants and trends

*Delaying the age of marriage has the greatest direct impact on fertility reduction*

2.7 There are four main proximate determinants<sup>14</sup> of fertility that may be influenced by public policy - contraception, spousal separation, marriage and breast feeding. Analysis of the Yemen Demographic and Maternal and Child Health Survey (YDMCHS, 1991/92) data (Table 3) indicated that one year of delayed marriage would result in the lowering of TFR by 0.3 live births per woman. Anecdotal evidence suggests that age of marriage is already on the rise<sup>15</sup>. Thus, any policy (e.g., increasing girls education) that influences the age of marriage is likely to play a significant role in fertility reduction.

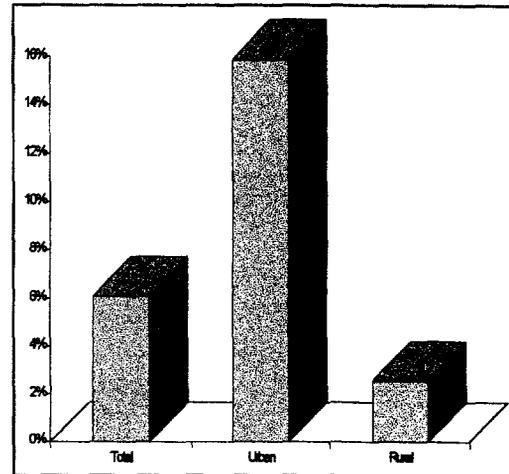
**Table 3: Impacts of changes in the proximate determinants of fertility on total fertility, Yemen 1991**

Determinants	Total	Urban	Rural
One month longer breastfeeding	-0.20	-0.14	-0.23
One percent point increase in contraceptive use	-0.09	-0.08	-0.09
One year delayed marriage	-0.29	-0.28	-0.30

Source: Annex 2.

2.8 The demographic transition<sup>16</sup> in Yemen has started. Fertility levels have started to decline, particularly among urban women (Figure 5). Urban women are five times more likely than rural women to use contraception, and younger urban women<sup>17</sup> are likely to marry two years later than their rural counterparts. Mortality continues to decline rapidly (infant mortality rates declined by 22 percent in the last fifteen years), indicating that the country is in the second stage of demographic transition with accelerated population growth.

**Figure 5: Percent decline in total fertility, 1988-1996**



Source: Annex 2.

### D. Policy options for reducing future population growth

2.9 In order to accelerate fertility decline, Bongaarts (1994)<sup>18</sup> outlines three broad policy options that governments can pursue:

- reduce the demand for children;
- weaken population momentum; and
- eliminate excess fertility.<sup>19</sup>

2.10 To assess the effect of applying these options on population dynamics of Yemen, the report describes and analyses the impact of a 'population action program' which aims at:

- Reducing the demand for children and weakening population momentum by stepping up the pace of education and awareness of population issues.
- Achieving the ideal family size based on expressed fertility preferences<sup>20</sup> by introducing a comprehensive reproductive health program, including family planning.

2.11 The first represents a demand-side approach. It seeks to initiate behavioral change, through a multi-pronged approach, that would stimulate demand for smaller family size. On the other hand, the second is mainly a supply-side approach. It is, to a large extent, assumed that if the barriers to service access are removed, provided services will be utilized. The supply-

side approach serves to fill a perceived need based on expressed or health-based fertility preferences. These two approaches are not mutually exclusive, but rather complement each other. For example, increasing demand for smaller family size would require an expansion of reproductive health services to ensure that desired family size is achieved.

### 3. A POPULATION ACTION PROGRAM

3.1 Achieving the ideal family size through a comprehensive reproductive health program has large welfare and fertility reduction benefits. However, if the Government of Yemen wishes to accelerate the demographic transition, it must also expand its interventions to reduce the demand for children and the population momentum. This can be achieved through a 'population action program' which is an integrated program that includes: (a) a comprehensive health package: reproductive health, and basic health and nutrition packages; (b) community-based basic education for girls in rural areas; and (c) social programs including information and communication programs. It has to be noted however that the education and social programs proposed in the 'population action program' are incremental to adequate planned public sector investments in these sectors. In contrast, the proposed incremental investment in health supplements a less than adequate public investment program in that sector.

3.2 The preferred fertility level used in this study is the response to the desired family size of women in the YDMCHS survey of 1991/92. It has to be noted that only 71% of the women in the survey gave a numeric response to this question. As such, this number (5.4) represents the best case scenario (i.e., the case where all women in Yemen desired on average to achieve this level) and is only used here for illustrative purposes.<sup>21</sup> The true preferred fertility level is expected to lie somewhere between the current fertility level and 5.4.

3.3 If the preferred fertility level of 5.4 is to be achieved in 25 years, contraceptive prevalence among married women would need to increase from the present level of 10 percent to 34 percent. Reducing high-risk pregnancies would result in a further reduction in fertility levels to 4.3 (Annex 6). The demand for children can be influenced by health, education and awareness and information program policies in the longer term, while population momentum may be weakened by postponing the age at first birth, which reduces the childbearing years of women of reproductive age. Postponing childbearing years can be encouraged by increasing female school enrollment rates, increasing the age of marriage, extending birth intervals and through social programs targeting adolescents. Delaying the average age of marriage in Yemen by a year will result in a 0.29 decline in live births per woman (Table 3). Better education and health act in a synergistic manner to enlarge the overall benefit of a 'population action program'.

3.4 If a 'population action program' was successfully implemented it is estimated that the population in Yemen would be seven million less in 2020 than if the present trend of slow decline were to continue. The overall cost of the above mentioned program would be about US\$2.5 billion. This cost estimate was based on current capital and operating expenses of the various types of governmental and non-governmental services<sup>22</sup>. This reduction in population would result in a

savings in public expenditure in basic health and basic and secondary education alone of over 60 percent of the costs of the program (i.e., US\$1.4 billion). These are partial savings and do not take into account public expenditure savings in other sectors, nor any private savings. In addition, there would be large welfare benefits, including a 46 percent reduction in maternal deaths and a 57 percent reduction in infant deaths (Table 12)<sup>23</sup>.

level of 10 percent to 34 percent, if the present preferred fertility level is to be achieved by 2020. In 1992, about 20 percent of women were unable to achieve the expressed fertility preference of the majority of the women; resulting in an achieved total fertility of 7.7 compared to a desired level of 5.4 (Table 4). Reducing high-risk pregnancies would result in a further reduction in fertility levels to 4.3 (Annex 6).

## A. Health

### Reproductive Health

*The ideal family size based on expressed fertility preferences could be achieved through a comprehensive reproductive health program*

*...with great welfare benefits as fewer women and children will die*

3.7 The reproductive health program is likely to have substantial impact on the welfare of mothers (Box 1) and children. Maternal health and access to health services are poor in

**Table 4: Total fertility rates, mean ideal number of children and contraceptive prevalence by selected background characteristics**  
(currently married women, age 15-49)

Background characteristics	TFR	Wife's mean ideal number of children	Husband's mean ideal number of children	Contraceptive prevalence
<i>Residence</i>				
Urban	5.6	4.4	5.3	28.2
Rural	8.2	5.6	6.9	5.7
<i>Region</i>				
North/West	8.2	5.5	6.8	8.3
South/East	5.5	4.9	5.9	16.7
<i>Education</i>				
Illiterate	8.1	5.6	6.9	7.2
Literate	4.9	4.1	4.7	29.9
<b>Total</b>	<b>7.7</b>	<b>5.4</b>	<b>6.6</b>	<b>9.7</b>

Source: YDMCHS 1991/1992.

3.5 The components of an appropriate reproductive health program are: (a) maternal health services;<sup>24</sup> (b) family planning programs; and (c) treatment of sexually transmitted diseases. Consequently, patients seeking one service could receive additional health benefits from a complementary service. For example, family planning could be introduced at a postnatal visit or antenatal visits which provide the opportunity to encourage breast feeding which has a natural birth spacing effect.

3.6 Contraceptive prevalence among married women would need to increase from the present

comparison to other countries (Table 5 on next page) and three out of every four pregnancies in Yemen are high risk<sup>25</sup> resulting in about 60,000 infant deaths<sup>26</sup> per year. Improving maternal health should be the Government of Yemen's priority<sup>27</sup> as:

- Improved maternal health has important intergenerational benefits. Children of mothers with high risk pregnancies are more likely to die (by reducing all high-risk pregnancy cases the infant mortality rate would decline from 92.7 to 60.1). Iodine deficient mothers have a greater risk of giving

birth to infants with mental impairment which impacts education expenditures through high drop-out and repetition rates.

- Improved women's health increases individual productivity and improves family well-being and when good health is linked education and access to jobs, the results are higher rates of economic growth.

The low rate of cesarean sections might reflect: (a) the delay or the absence in seeking assistance for difficult deliveries; or (b) the poor quality of obstetric care provided.

*The present program cannot achieve this*

3.9 The existing public health system is based

**Table 5: Selected maternal health indicators**

Indicators	Yemen	Egypt	Jordan
MMR per 100,000 births	1,000	174	40
Female-male difference in life expectancy at birth (years) <sup>28</sup>	1	3	4
ANC utilization (%)	26	38	80
Delivery attended by trained personnel (%)	16	46	87

Source: YDMCHS 1991/1992, EDHS 1995, JPFHS 1990, National Maternal Mortality Study Egypt (1992-1995).

*...especially since many mothers die of avoidable causes*

**Box 1: Maternal Mortality**

Experience from the United States and United Kingdom indicates that maternal mortality unlike infant mortality is remarkably sensitive to standards of obstetric care but remarkably insensitive to changes in socioeconomic development. Maternal mortality in the US at the turn of the century was at similar levels as in Yemen today and did not start to drop until the 1940s as blood transfusions and antibiotics became widely available. The importance of obstetric care for reducing maternal mortality is vividly illustrated by the maternal mortality rate of about 900 in a religious sect in the US which does not use modern medical services compared to 8 per 100,000 in the general US population. Therefore, to reduce maternal mortality in Yemen, it is essential that access to appropriate maternal care is rapidly improved.

Source: Deborah Maine, "Safe Motherhood Program: Issues and Options".

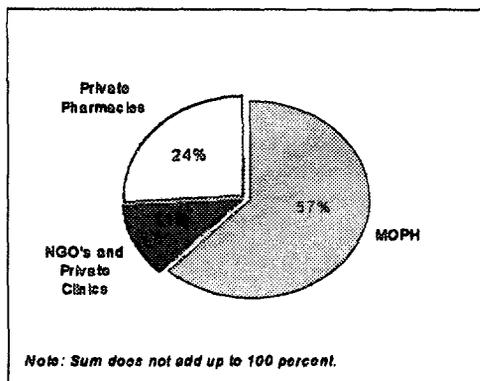
3.8 It is estimated that the main direct causes of maternal mortality are hemorrhage (28 percent), ruptured uterus (23 percent), eclampsia (19 percent) and infection (19 percent).<sup>29</sup> These conditions are usually treated with emergency obstetric care including cesarean sections. However, cesarean section rates at major referral centers in Sana'a and Aden<sup>30</sup> appear low at 9 percent compared to around 15 percent in other low income countries such as Pakistan (Annex 6).

on several levels of service from primary health care (PHC) units (927 in 1994) and health centers (375 in 1994) at the primary level. These range from the presumed first contact point between the community and health delivery system to small and medium-size hospitals at the secondary level and large tertiary care hospitals located in the cities (81 in 1994). The public sector is dysfunctional and a fifth of the primary level facilities are not functioning (mainly due to lack of qualified staff and limited operational budgets). The private sector<sup>31</sup> is an increasingly important component of the health care delivery system. However, little is known on the number of facilities, their utilization, costs and quality of services provided.<sup>32</sup> An assessment of the health sector in 1996<sup>33</sup> suggested that in order to address the problems in the sector, the Government will need to address four critical areas:

- government policies including sustainability of public sector provision of services;
- the role of the MOPH in organization, regulation, delivery and financing of services;
- health sector financing--inadequate resources and inefficient allocation; and
- health services delivery--limited access and poor quality.

3.10 The limitations of the overall public system are reflected in the delivery of reproductive health services. In 1992, only 45 percent of the population had access to these services as the predominantly rural population lived outside the catchment area of health facilities. Geographical accessibility is further hindered by high transport costs (a taxi ride in an emergency situation from a village to the closest hospital, 38 km away, may cost as much as 7 percent of average annual per capita expenditure).<sup>34</sup> The contraceptive mix is limited and 72 percent of current users use the pill or IUD. Just over half of all modern contraceptives are provided by the public system supported by donors (Figure 6).

Figure 6: Sources of Family Planning



Source: YDMCHS 1991/92

... and requires significant improvement

3.11 The fundamental change required to improve reproductive health care for Yemeni women is systemic health reforms as discussed in para. 3.8. Systemic reform is a long process, so the following actions are suggested in the short term (within one year).

- ◆ The Government should give priority, in the short term, to ensuring the adequate functioning of the present health care system before embarking on widespread expansion of infrastructure.
- ◆ Appropriate reproductive health services, including family planning, should be provided at each level of health facility (Table 6).

- Given the difficulty in access of the rural population (three quarters of total population), the first priority should be strengthening of focal points (district hospitals and large health centers) for delivery of services.

- From each focal point, extension of service networks to various communities (especially rural) should be developed. This could be done through managing and coordinating of services of lower level health care facilities in their district in some areas e.g. PHC's, and by using basic mobile units or private transportation of key health staff such as midwives, in others.

- ◆ To ensure that these services are delivered effectively and efficiently, two systemic issues need to be promptly addressed:

- Low quality and maldistribution of health providers by improving incentives<sup>35</sup> for health staff to encourage: (a) improved management and accountability; (b) appropriate staff distribution, e.g., more female staff in rural areas; and (c) training and monitoring of health personnel.

- Insufficient funds for operation and maintenance by: (a) increasing the public budget<sup>36</sup> for health; and (b) widening the use of cost recovery mechanisms for use at point of collection and service delivery, taking into account present in-country experience, e.g., Dhi Sufal Health Center in Ibb governorate; Hodeidah Urban Primary Health Care Program in Hodeidah city. Appropriate measures should be taken to protect the poor from any increased costs.

- ◆ Local NGOs (see Box 2) and the private sector should be encouraged to provide preventive maternal care and family planning packages. This may be achieved by ensuring adequate information is provided on reproductive health issues and/or financial incentives for provision of appropriate care.

**Box 2: Yemen Family Care Association**

The Yemen Family Care Association (YFCA), an affiliate of the International Planned Parenthood Federation (IPPF), has been active in the provision of family planning services since 1976. Collaborating with MOPH, YFCA distributes contraceptives mainly through 231 MOPH Health Centers in 14 governorates. In addition, YFCA has four clinics in four urban centers directly providing family planning and Maternal and Child Health services in 4 major cities. The size of YFCA's clientele (171,000 in 1995) grew over 20 percent per year between 1992 and 1995. It plans to open several additional clinics and to start Yemen's first mobile clinic in 1997. It appears to be a well administered organization which has capacity for further expansion.

Source: Atif A. Saghayroun, "Family Planning Movement in Yemen: where we stand 1976-1996".

major reasons given in the YDMCHS(1991/92) for not using contraception by current non-users, were lack of knowledge (23 percent), husband's disapproval (16 percent), and religious beliefs (15 percent). Consequently, Information, Education and Communication (IEC) activities are an essential component of a comprehensive reproductive program. At present, the MOPH does not produce any IEC materials for family planning.

***If a comprehensive reproductive health package is introduced***

3.13 A comprehensive package of reproductive health services would cost US\$1.03 billion over the next twenty five years (details in Annex 6). In 1996, the program costs would have been about 10 percent of the MOPH budget. The family planning program component of the program would cost about US\$190 million. In comparison, the estimated savings in public expenditures on

**Table 6: Sample Reproductive Health Services Package**

	Institute / facility	Interventions
Central Government	MOPH	Strategic management of health systems including referral and reporting Monitoring and supervision of quality of services Widen method mix
Focal points	Hospitals - public and private	Provision of contraceptives, counseling and follow-up Management of high risk pregnancies and deliveries Diagnosis and treatment of STDs
Primary health care	Health centers, Primary health care units, private clinics, mobile units	Provision of contraceptives, counseling and follow-up Maternal care (ANC, postnatal and delivery care) Symptomatic management of STD Training and supervision of PHC workers
Community	PHC workers, pharmacies, local NGOs	Provision of family planning information, simple contraceptives Nutrition/breast feeding counseling Identification of local needs
IEC	Dept. of Health, Educ. & Info. of MOPH, MOI, Mass media, youth groups, religious leaders	Interpersonal communication by health staff at all levels Preparation/distribution of IEC materials, TV/radio programs

Source: Based on WHO recommendations; A New Agenda for Women's Health and Nutrition, World Bank (1994); and Staff recommendations.

3.12 However, improving access to services will not guarantee increased utilization especially in family planning as only 60 percent of women know about specific contraceptive methods. Barely a sixth of current non-users expressed an intention to utilize contraception in the future. The

education and health alone (US\$471 million) would be nearly two and a half times the cost of the family planning program. Thus, the costs of the family planning component can be justified solely on the basis of economic savings to the government.

... the population of Yemen in 2020 would be about 3.4 million less

3.14 The comprehensive reproductive health program approach discussed above has the following advantages (see Annex 6):

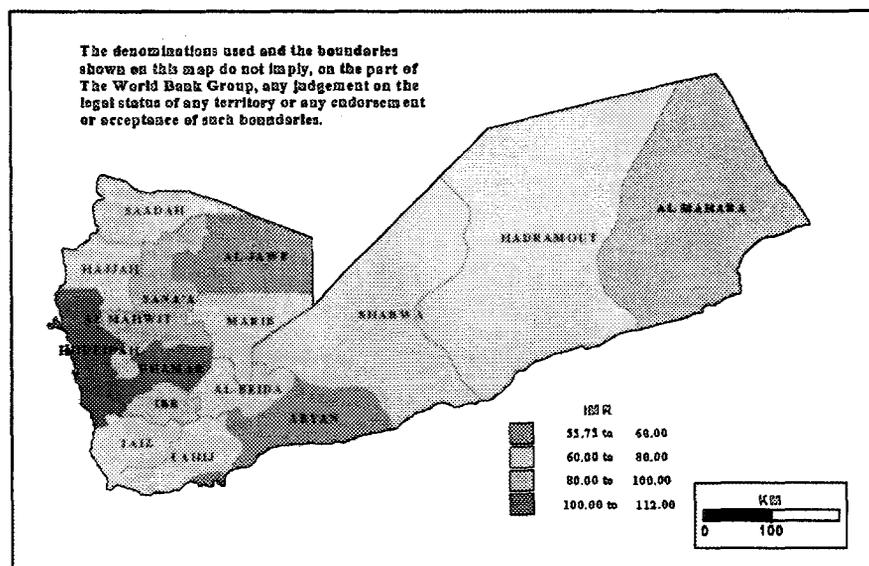
- Reduction in population in 2020 by about 3.4 million;
- Reduction in maternal mortality and morbidity by 35 percent;
- Reduction in infant mortality by 45 percent, morbidity and low birth weight cases by 29 percent;
- Savings in public expenditures in education (basic and secondary) and health of US\$699 million;
- Culturally acceptable for the family and the

### Basic Health and Nutrition

*Improving health of infants and children could result in further fertility decline*

3.15 In addition to improving reproductive health, improving the overall health status of infants and children will reduce fertility as parents tend to take into account high infant and child mortality when deciding on their ideal family size. Infant and child mortality declined substantially in Yemen (though the rate of decline has been less than in other countries such as Egypt where IMR declined by 46 percent in the last decade). The decline could be hastened. The overall national figures masks significant regional differences (Figure 7).

Figure 7: Infant mortality rates by governorate, 1994



Source: Census, Republic of Yemen, 1994.

- community, with convincing health benefits;
- Makes the best use of the existing health system;
- Broader focus aimed at all women seeking health care;
- Possible reduction of drop-outs through providing better counseling and follow-up; and
- Improvement in productivity through improving women's health;

*The most common causes of infant and child deaths are avoidable and could be prevented or treated in an affordable manner*

3.16 Fifty percent of child mortality is a result of a diarrheal illness or acute respiratory infection. It is likely that a majority of these deaths could be avoided by the use of oral rehydration therapy

**Table 7: Sample Health and Nutrition package**

	Institute/Facility	Interventions
Central Government	MOPH	Strategic management of health system including referral and reporting Monitoring the quality of services Decrease qat consumption <sup>37</sup>
Referral centers	Public and private hospitals, health clinics w/ beds	Clinical case management
Primary health care	Health clinics, health units, NGO and private clinics, mobile units	Integrated management of childhood illness Preventive care including immunization and nutrition counseling Provide micronutrients to vulnerable groups
Community	Local NGOs	Provide information on health/nutrition Micronutrients/food supplements School health
IEC	Dept. of Health Educ & Inf. of MOPH, MOI, Mass media, youth groups, religious leaders	Preparation and distribution of IEC materials

(ORT) for diarrheal illnesses and by early detection and treatment of acute respiratory illness. Both these interventions can be provided in an affordable manner even at the primary health care level. A sample package (Table 7) to address these issues and other major health and nutrition problems of children is presented below. To ensure proper delivery of these services, actions as described in para. 3.8 are required. Regional differences in health conditions should be taken into account in applying this sample package. This sample package for infants health and nutrition will cost US\$823 million to implement over the next twenty five years.

*...through both public sector and community-based efforts*

3.17 As previous experience in Yemen has shown, community-based organizations could be an integral part of the delivery system (Box 3).

## **B. Education**

*Education of girls has a large effect on reducing fertility rates for a number of reasons*

3.18 Of all the social and economic factors that have been studied for their potential effect on the proximate determinants of fertility (see para. 2.7), the level of education of women stands out as the most consistent. Evidence shows that even 1-2 years of schooling has a significant impact on

family health and fertility as language, behavioral and literacy skills are gained which help women use information better.<sup>38</sup> Improvements in the educational status of women can reduce fertility in a number of ways:

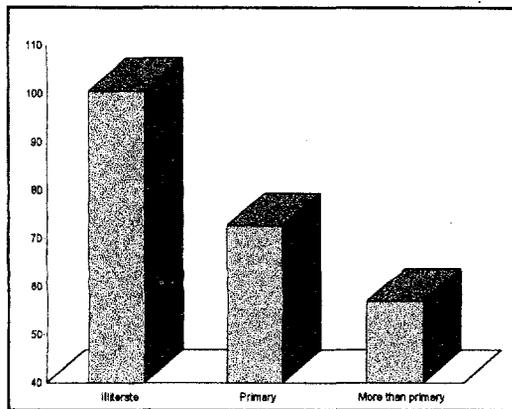
### **Box 3: What Happens When Government Services Collapse**

Several years ago Government recurrent allocations to Raimah District in a far corner of Sana'a Governorate dropped drastically in real terms and among others health services declined precipitously. In response leading citizens of the District formed a District Health Council (DHC). The local Department heads of the Ministries of Health, Education, Social Affairs, Trade and other principal public sector agencies in the District, 4 prominent local personalities and representatives from the 6 sub-districts were asked to participate. To establish the trust of ordinary citizens in public agencies, which has been severely undermined by corruption in recent years, the Council conducted a competitive and open selection process for the financial officers of the organization, and the first funds received (from an NGO) were handed over in a public meeting. Two generators supplying electricity to the District hospital and a health center providing reproductive health services have been repaired and the next priority is to provide health facilities with funds for essential drugs. To finance this the DHC is instituting a small local tax on bags of flour sold at the retail level.

Source: International Development Cooperation.

- Reduced infant mortality rates, thus reducing the number of births required to achieve the desired number of children (Figure 8)

**Figure 8: Infant mortality and mother's education**



Source: YDMCHS 1991/92.

- Delayed age of marriage (Table 8).

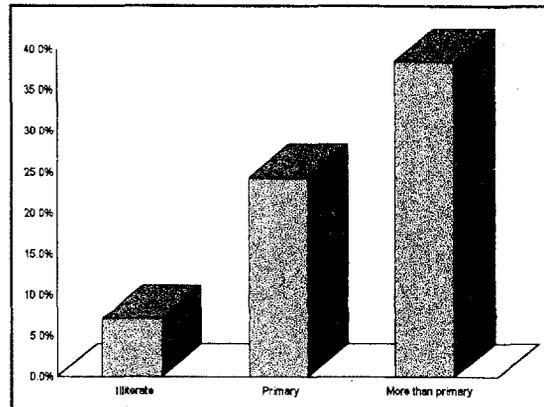
**Table 8: Median age at first marriage (age 24-59) by level of education**

Level of education	Median age at first marriage
No schooling	15.7
More than primary	22.9

Source: YDMCHS 1991/92.

- Increased contraceptive use thus helping women limit and space childbearing more effectively
- Improved private returns to labor (through improved productivity) and thus raises opportunity costs of childbearing (Figure 9).
- Starts a virtuous spiral of improved family welfare --- an educated mother is more likely to educate her own children, particularly girls, and those children will educate their children.
- Allows women to rely less on children as insurance against adversity and old age.

**Figure 9: Current use of contraception by level of education**



Source: YDMCHS 1991/92.

*Although the Government gives it priority, Yemen still educates very few girls*

3.19 The demographic benefits simply strengthen the rationale for intensifying Yemen's policies on female education. Though Yemen has increased its enrollment rates for girls at the lower educational levels in the last two decades, its education indicators remain among the poorest in the world and improvements have been slow (Table 1).

*There are a number of reasons for this* (See Table 9 on next page).

*But above all, the public sector alone cannot increase girls enrollment beyond about 50 percent*

3.20 The Yemen Public Expenditure Review (1996) concluded that even with the most favorable budget reallocations to public education likely over the next five years (an increase to 19 percent of total government spending), girls enrollment will rise from 35 percent to 50 percent by 2000. If the government wishes to accelerate progress towards its goal of 90 percent enrollment in basic education by 2006,<sup>39</sup> new approaches are required to increase the enrollment rates of girls in basic education.

**Table 9: Barriers and solutions for girls education**

Types of barriers	Barriers	Solutions
<i>Economic factors:</i> A. Direct Costs	Cost of schooling (school fees, learning materials, and uniforms) was estimated at between \$20-\$60 per student per year in 1995. <sup>40</sup>	a) Providing special incentives for girls. b) Supplying textbooks.
B. Opportunity Costs	Time spent in household chores - sibling care, fetching water, fuel etc.	a) Flexible school hours. b) Community based education. c) Establishing child care centers.
<i>School and MOE related factors:</i> A. School facilities	Few places for girls in school. Only 2% of schools are for girls only. Lack of essential infrastructure-classrooms, sanitary facilities (44% of schools have no toilet), boundary walls. <sup>41</sup>	a) Expanding number of school places for girls b) Building single-sex schools or introducing double shift (separate shift for girls). c) Providing essential infrastructure-classrooms, toilets and boundary walls.
B. Gender-bias in schooling	Gender-bias in curricula and teacher training.	a) Gender-sensitized curricula and teacher training.
C. School quality	Weak curricula. Lack of books, blackboards, laboratory facilities in secondary schools. Teacher absenteeism.	a) Revising curricula to reflect needs. b) Supplying books, blackboards and laboratory equipment. c) Provide accountability/incentive systems.
D. MOE	Limited managerial, financial and technical capacity.	a) Institutional strengthening. b) Widening sources of funding from community, reallocation of resources.
<i>Social factors:</i> A. Female teachers	Low availability of qualified female teachers in many areas. Lack of reliable transportation for female teachers to rural schools. Lack of suitable institutions with housing for teacher training programs.	a) Identifying and recruiting female teachers, particularly in rural areas. b) Revising recruitment criteria - e.g. relaxation of qualifications c) Building teacher training institutions with housing and/or transportation.
B. Distance to school	Few schools close to homes in rural areas. Lack and cost of suitable transportation for girls.	a) Build school closer to villages, e.g., community schools.
C. Social Customs	Early marriage and early childbearing -16 in rural areas. Educating girls considered irrelevant or inappropriate.	a) Enforce legal age at marriage. b) Generate parental and community demand for girls education through awareness campaigns e.g. through involving religious leaders.

*If girls enrollment rates are to be increased, new community-based approaches may be one answer<sup>42</sup>*

3.21 This report proposes the introduction of community-based schools which would supplement the Government's provision of formal education in order to increase enrollment rates for girls beyond what is possible under the public education system. Students graduating from these community-based schools would be accepted into the public education system for further education. It also proposes a continuation of the non-formal adult literacy and life skills program supported by

several donors to provide another opportunity for some girls and women to become literate and to learn basic skills to enable them to earn income. The community-based schools strategy would have two objectives:

- to increase access to basic education for girls in rural areas; and
- to improve retention rates for girls.

*Community-based programs will involve the government, NGO's, donors and the communities themselves. (See Table 10 on next page)*

3.22 Table 10 describes a sample community-based education package.

**Table 10: Community-based Education**

Level	Government	Community	Donors	Social Fund/NGOs
Demand	Awareness & IEC campaigns. Financial incentive mechanisms.		Help design and fund financial incentive mechanisms.	Awareness & IEC campaigns.
Implementation	Provide textbooks, approve curriculum, and teacher training. May accept qualified teachers into formal education system later. Set program standards. Evaluate program performance. Assessment testing. Accept graduating students into public education system.	Provide land and labor. Identify and recruit local female teachers. Accept accountability. Supervision & monitoring.	Provide TA, equipment, materials, and training.	Help identify local female teachers. Supervision & monitoring. Disbursements of funds.
Funding	Provide some recurrent cost.	Contribute in cash or in kind.	Provide grant financial assistance through Govt., Social Fund, or NGOs.	Social Fund could act as financial intermediary. Help raise funds from community.
Target Group	Girls in rural areas.			

***Communities themselves can help increase the number of girls in schools***

3.23 The underlying premise of the community based approach is that communities must take some responsibility for the provision of education in their community for either costs, facilities, management or the quality of education provided. In essence it means that communities help fill the gap which Government cannot now fill. Community-based schools can take many forms depending on the region and locality, its traditions and capabilities. Variations on this approach are being used successfully in Yemen as well as in several other countries (Box 5 on next page).

***... in an affordable manner with differing costs to suit various communities abilities to contribute***

3.24 The annual cost per student in community schools, ranges on average, between 20 percent to 55 percent of current annual public expenditure per student.<sup>43</sup> To increase enrollments for girls to 87 percent by 2020, it is assumed that about 30

percent of girls aged 6-14 would have to enroll in the proposed community-based schools. The cost of such a community-based program would be about US\$588 million over the next twenty five years.

***Non-formal adult education may be an effective tool for improving adult female literacy***

3.25 The objective of non-formal adult literacy and life skills programs is to provide another opportunity for girls and women to become literate and to learn basic skills to enable them to earn income. Donors including IDA are supporting the reorientation and upgrading of existing Adult Education and Training Centers (AET) in Yemen and this report endorses that limited approach. Because of the poor outcomes obtained under prior programs this report does not recommend any expansion of non-formal adult literacy and life skills programs until this program has been evaluated.

**BOX 5: COMMUNITY-BASED APPROACHES TO INCREASE GIRLS' ENROLLMENT IN BASIC EDUCATION**

Programs in several countries have demonstrated that specific approaches to teacher selection, training and supervision and parent and community involvement can increase girls' enrollment in basic education.

**Bangladesh:** The Bangladesh Rural Advancement Committee (BRAC) program has 30,000 donor supported community schools for girl students between 8-16 years of age. A community can request a school when it has 30 students to enroll. A "classroom" is rented, basic equipment is provided for by parents, and a married female resident of the village with a minimum of Grade 9+ education is selected as teacher. A management committee comprising parents, a community leader, and the teacher runs these schools. The curriculum is a slightly abridged version of the formal systems' curriculum. The cost per enrolled student per year is about US\$12. The academic performance of BRAC students was found to be higher than students who had completed Grade I-III in the formal system. This is one of seventeen similar programs in Bangladesh.

**Baluchistan, Pakistan:** A rural village without an established government school, establishes a village education committee assisted by a contracted local NGO and identifies a qualified female teacher residing in the village. A temporary building for the school is arranged and at least 25 girls ages 5-10 are required. The program is funded through a scholarship of US\$4 for each female student enrolled. This amount increases with increased enrollment and attendance. The committee has authority to allocate the budget as it sees fit. A proportion of the funds is saved every month to finance the school after completion of the project. The cost per enrolled student per year is about US\$92 (1994), less than government schools, to achieve the same goal. The program is donor supported.

**Republic of Yemen:** Through pilots in Hodeidah and Rafdan, UNICEF in Yemen provides girls with education up to grade 4. A minimum of 30 girls in the 6-12 year age-group are required to start the school. With involvement of community leaders, Governorate education officials and UNICEF field staff, two female teachers are identified from a nearby secondary school. The community contributes a "classroom" facility using local materials, basic furnishings, and equipment and manages the school. The training, teaching and learning materials and a travel allowance for the teachers are paid for by UNICEF. The cost per enrolled student per year is approximately US\$37. To increase the availability of female teachers, a parallel program offers stipends to female secondary students to encourage them to train as teachers. After completing the program, the female students are absorbed by the formal government system.

Source: see Annex 7.

*Two further policy measures to support a community-based schools strategy can help*

of locally recruited female teachers for community-based schools.

3.26 This report has two other recommendations to encourage and support communities in their efforts to provide education to girls:

- Schools should be permitted to retain and use on a discretionary basis all fees which they collect. The Government could permit schools to retain 100 percent of fees collected (versus the 20 - 50 percent now permitted). This would be consistent with the government's decentralization program.
- Reopen some of the Teacher Training Institutes for girls completing preparatory (level 8) school that were closed in recent years. To attract girls from villages, the use of boarding facilities should be considered. This would provide a supply

### C. Social programs

*Targeted social programs can also help lower fertility levels*

3.27 Poor households have, on average, one child more than non-poor households.<sup>44</sup> While there is no data available on family size and poverty, if household size is used as a proxy, this data suggests a link between higher fertility and poverty. The relationship between poverty and fertility is complex and appears to have circular links.<sup>45</sup> But experience in other countries suggests that poverty reduction is essential to help accelerate demographic transition and improve the impact of reproductive health services.

3.28 In addition, social programs that lead to improvements in the economic and social status of women reinforce a reduction in desired fertility

levels in various ways. They raise the cost of children by making non-maternal roles more important, and increase women's willingness to engage in contraceptive behavior (for example women who work for cash are four times more likely to use contraceptives than women who do not work for cash).<sup>46</sup>

***A major effort to expand social programs is needed***

3.29 This report endorses the Government's plans to improve poverty alleviation programs by: (a) reforming and slowly expanding the Government's Cash and Food Aid Program--the cash transfer program for the unemployable poor; and (b) supporting the establishment of financially self sustainable micro-enterprise and income generating schemes for the employable poor.

3.30 It also recommends: (a) encouraging local initiatives to expand community provision of welfare and social service delivery (see paras 3.10 and 3.23, and Annexes 6 and 9) ; and (b) expanding advocacy, awareness and IEC programs at the national, Governorate and community level with the objective of stimulating demand for smaller family size and for family planning services among couples of reproductive age.

3.31 In order to achieve expansion of advocacy, awareness and IEC programs, the following key approaches are suggested: (i) IEC institutional building at national, governorate and community levels (particularly in advocacy, training and research); (ii) completing of the national IEC strategy (Annex 11) and implementing programs that support the strategy (Annex 7); (iii) upgrading interpersonal communication and counseling skills of reproductive health providers (also an integral component of the reproductive health package described in Table 7); and (iv) more effective use of the mass media, especially of radio and television which are expanding their coverage rapidly (See Appendix 2).

***A vehicle through which they can be delivered has been established***

3.32 To give impetus to the expansion of community initiated programs, this report endorses the establishment of the new Social Fund for Development (SFD), which can help implement innovative initiatives by providing grants to NGOs, local community organizations and relevant public sector agencies for small decentralized proposals. It can also be an effective mechanism for capacity building at the local level. It is described in more detail in para. 4.6. For illustrative purposes a combination of IEC capacity building, awareness creation and family development projects have been designed and costed. If these programs were implemented in all eighteen Governorates over the period 1997-2020, the cost over the next twenty five years would be about US\$76 million dollars (Annex 7).

**D. Cost-benefit analysis of the population action program**

***Implementing a population action program is affordable, effective and cost beneficial***

3.33 In addition to reducing maternal deaths by 46 percent and infant deaths by 57 percent, successful implementation of this program (Table 12), which includes: (a) the comprehensive health package family planning, other reproductive health components, and health and nutrition

**Table 11: Cost benefit analysis (in 1995 US\$)**

Savings in public expenditure per birth averted	161.22
Cost per capita (in 2020)	6.37
Cost per birth averted	286
Cost per adverse event averted <sup>a</sup>	282
Cost per death averted	622

Note: a. Adverse events include infant and maternal deaths, episodes of maternal morbidity and low birthweight babies.  
Source: Staff calculations (Annex 7).

**Table 12: Estimated cumulative impact of a population action program by 2020**

	Current Trends	Population Action Program
Population (millions)	36.6	29.4
Total Fertility rate	6.1	3.1
Maternal deaths (number)	279,164	150,232
Maternal morbidity (millions)	4.47	2.40
Infant deaths (millions)	2.58	1.11
Low birthweight babies <sup>47</sup> (millions)	5.03	2.31

Source: Staff calculations (Annex 7).

packages; (b) community-based education, and (c) social programs will result in public expenditure savings of about US\$1.4 billion. The cost-benefit

analysis of the program is summarized in Table 11 (details in Annex 7)

#### **4. TOWARDS A POPULATION PROGRAM: OPERATIONAL RECOMMENDATIONS**

*The Government of Yemen has established ambitious goals, for slowing population growth, which could be achieved by implementing the 'population action program' in a financially feasible and sustainable manner*

4.1 As noted in para. 1.10, the Government has given high priority to its population program, and has set targets for the year 2006. While these targets are not likely to be achieved, they represent an expression of political determination on the part of the Government, which is the essential base for subsequent action.

4.2 The report assesses the feasibility and sustainability of the proposed 'population action program' as a share of expected future GDP and public expenditures. GDP growth is assumed to remain constant at 5 percent a year until 2020, total public expenditure at 35.5 percent of GDP, public health expenditure at 2.6 percent of GDP, and public education expenditure at 6.4 percent of GDP until 2020.<sup>48</sup> The proposed total program costs would be approximately 1.5 percent and 5 percent of total public expenditures in the years 2000 and 2020, respectively.

*But a special effort will be required, particularly in health*

4.3 The budgetary impact of the proposed education and social programs is not financially significant. But the proposed health program would absorb 45 percent of the proposed health budget in 2020. Public expenditures on health were 1.2 percent of GDP, which is low by international standards. As the health component is conservatively designed and costed, its budgetary impact reconfirms that the health sector is seriously under-funded in Yemen. Even if total public health expenditure more than doubles by the year 2000 as recommended in the Yemen Public Expenditure Review (1996), the health program would require increased private and non-governmental expenditures on family planning and reproductive health programs. Further details are in Table 13 on next page.

**Table 13: Sustainability of proposed active population program (annualized costs)**

	1995	2000	2020
<b>A. Program Cost as Share of GDP (%)</b>			
1. Health Program	0.68	0.79	1.15
2. Female Community-based Education Program	0.23	0.26	0.28
3. Social Program	<u>0.01</u>	<u>0.04</u>	<u>0.03</u>
Total	0.92	1.09	1.46
<b>B. Program Cost as Share of Total Public Expenditure (%)</b>			
1. Health Program	2.04	2.34	3.45
2. Female Community-based Education Program	0.70	0.78	0.82
3. Social Program	<u>0.02</u>	<u>0.13</u>	<u>0.10</u>
Total	2.76	3.25	4.37
<b>C. Program Cost as Share of Sector Expenditure (%)</b>			
1. Health Program	26.25	30.20	44.42
2. Female Community-based Education Program	3.64	4.10	4.30
3. Social Program	4.34	38.31	28.27
GDP (US\$ Billion)	3.78	4.82	12.80

Source: Staff calculations.

\* Numbers may not add up due to rounding.

*After financial sustainability a second condition for implementation is an institutional framework which makes clear the roles of all the parties involved*

4.4 As noted in para. 1.12, the weakness of Yemen's institutions in the population sector is a major constraint. It will be essential to provide an institutional framework, which makes clear each agency responsibilities. A detailed functional matrix is contained in Annex 5. The NPC should remain the umbrella organization providing leadership in the population sector (in accordance with the presidential decree no 113/1992). It should remain responsible for population policy and planning, and overall monitoring/follow-up and evaluation. Its function should also include coordination of all population activities by all ministries, external agencies and the private sector (including NGOs). An example of its activities include the development of standard monitoring indicators for all organizations involved in the delivery of family planning services. It should concentrate on carrying out these basic functions and should not attempt to develop any implementing role. The MOPH would have

primary responsibility for implementing the health programs, which is predicated on an implementation strategy of strengthening existing district level hospitals and public clinics, while giving community organizations and NGOs responsibility for any expansion of coverage. The MOPH faces very serious institutional capacity constraints, including in the Directorate for MCH, which is responsible for reproductive and family planning service delivery. So an intensification of donor support and enlargement of the kind of role played by the YFCA, which is responsible for the importation and distribution of contraceptives in Yemen, would be very important ingredients of program success. In addition, the MOPH is currently taking steps to address its capacity constraints. One such example is the institutional capacity building component that is being discussed as part of future World Bank assistance.

4.5 The other key Government actors are the MOE, MOSA and MOI. The MOE gives priority to girls education and would continue to expand access within its budgetary limits. If the Government is willing to proceed with community based education for girls, the MOE would need to

determine its role, which on the basis of experience in other countries could range from being the implementing agency for the program to playing an oversight and quality control role. The roles of the MOSA and MOI would be to provide strategic oversight and give strategic focus to the recommendations for social development programs. As these recommendations are mainly for an intensification of effort at the community level, implementation would be the responsibility of local organizations. It is essential to give communities, NGO organizations and the private sector a major role in the delivery of the 'population action program' at the local level as the Government has neither the resources nor the management capability to implement all of the program. This recommendation is consistent with the Government's policy of decentralization (see para. 4.9).

*Given institutional weaknesses special development efforts and initiatives are needed and will involve several partners*

4.6 The Government is in the process of establishing a Social Fund for Development (SFD). This will be a major step forward in establishing a mechanism to provide an effective channel for capacity building and donor financial support to all organizations implementing population or population related programs in Yemen. It could act as an intermediary for donor funds and complement Government programs and implementation. It could be responsible for overall management of the part of the 'population action program' that is not Government funded and the small group of competent NGOs working at a national level could act as intermediary organizations. It could operate a demand-driven fund to which communities or local NGOs would come with a proposal, which would have to meet specific criteria to be accepted. It could finance capacity building of the intermediary NGOs as well as local NGOs and community organizations.

4.7 The program is only sustainable in institutional terms if communities, NGOs, both

domestic and international, the private sector and new kinds of organizations like the Social Fund play a major role in implementation in partnership with the Government. Multilateral and bilateral donors play an essential role in financing existing population programs in Yemen and their support of the proposed 'population action program' is essential. The cost of this program would have been 28 percent of total donor assistance provided to Yemen in 1995, with the health component at 6 percent more than present donor assistance to the sector. These numbers indicate that increased donor assistance in these sectors in addition to increased government expenditures and private investments are required to make such a program sustainable. It also underlines the extent to which the health sector has been under-funded in Yemen.

*NGOs and community organizations will require support and strengthening*

4.8 In addition to support from the Social Fund, the report has three other recommendations for the strengthening of local community organizations and NGOs: (i) create a more favorable enabling regulatory environment for NGOs than the present or proposed legislation provides; (ii) identify and develop local NGOs at the Governorate level and encourage local networking among these NGOs as well as partnerships with the major domestic and the international NGOs; and (iii) the Government could also allow districts to retain more than 25 percent of "zakat" collected - up to the 1980s they retained up to 75 percent - to be used for local social and economic development projects.

*The Government's decentralization program offers opportunities for strengthening public sector institutions at the local level involved in implementing the 'population action program'*

4.9 To address the absence of infrastructure at the local level, the Government began a decentralization program in 1995. If well introduced this could help the 'population action program' succeed. But the Government needs to

clarify the following issues. The types of services, accountabilities and fiscal mechanisms and the level to which such services are to be decentralized; equity, national welfare and management capacity issues; phased introduction to provide for administrative capacity enhancement and training for governorate and below units; and Central Ministries will need to develop the capacity to monitor quality and performance, and set standards and guidelines for services provided by the various levels of government.

*Above all Yemen's political establishment will have to give strong and sustained leadership if there is to be progress*

4.10 Successful implementation of the proposed program will require strong and

sustained leadership and political commitment from the highest authorities in Yemen. Without that it will not work. There are signs of awareness and change already. These suggest that with political leadership, donor support and an enlarged role for communities and the private and non-governmental sectors in a partnership with Government, the 'population action program' could help accelerate the demographic transition in Yemen. This, combined with improved population management by the Government in the areas of employment, water and social sector service provision in particular, and a sound macroeconomic policy framework would do much to move Yemen towards improving the standards of living and the quality of life for all citizens, the key goal of the 1996 National Plan of Action.

## 5. CONCLUSIONS

*To help achieve its goals the Government should implement the proposed 'population action program'*

5.1 This report suggests that by: (a) delivering a comprehensive health package, including reproductive health, for women and children; (b) expanding girls educational opportunities using a community-based approach; and (c) complementing these with strengthened social programs, the Government can help accelerate the demographic transition while improving its population management policies. To maximize impact, this 'population action program' must be complemented by and complement those policies which encourage sustainable economic growth and poverty reduction.

*Solid macroeconomic growth is an absolute prerequisite*

5.2 In chapter 4, it was noted that under a 5 percent rate of economic growth until 2020 the proposed program would be about 1.1 percent of GDP in 2000 rising to 1.5 percent in 2020. We conducted a sensitivity analysis to see the effects of two other growth scenarios - a 3 percent and a 7 percent GDP growth rate. The cost of the health program alone would range between 2 - 6 percent of total public expenditures while the full program would cost between 3 - 7.5 percent of total public expenditures in 2020. This underlines how important it is for the Government to continue with its macroeconomic reform program as the basis for long term sustainable growth.

*Population management must also be a priority*

5.3 In addition to working to reduce avoidable future population growth, the Government will have to intensify its management of population growth (see para. 4.10). This is because as official population figures project and as this report confirms, the population of Yemen will double in about twenty years - even under best possible outcomes of interventions to reduce fertility. This will be a continuous and demanding task.

*The role of the World Bank and the donor community - the next step*

5.4 It is clear that even under the most favorable macroeconomic scenario the proposed program can only be implemented with support from donors. Donors can provide help in three main ways. They can: (a) support policy and research work related to population issues; (b) support institutional capacity building and data and information gathering capacity in the large variety of Government agencies involved in the population sector; and (c) provide financial support for program implementation. The World Bank is prepared to give this program high priority in its country assistance strategy for Yemen. The World Bank has been a long-term partner with the Government of Yemen in the social sectors, particularly in health and education, and will continue, as long as it is needed, to assist the Government of Yemen in these sectors. The partnership between the Government of Yemen and the World Bank in the development of the new Social Fund for Development is another stage in this long term relationship. Other donors such as the UNFPA, and the Government of the Netherlands have played major roles in the health and population sectors. They and other interested donors would obviously be key players in implementing this program.

5.5 If the Government is interested in pursuing this program, this report recommends that it call a meeting with the donor community to review the program and to reach agreement on donor support for its implementation. The upcoming consultative group meeting could provide an optimum opportunity for this discussion.





**SUCCESSFUL IEC PROGRAMS IN POPULATION**

Egypt. The Minya IEC Initiative was an 18-month innovative, collaborative IEC project that aimed at increasing quality, coverage and utilization of family planning services, particularly in the rural areas of this Upper Egypt governorate. The project trained religious leaders, doctors, nurses, teachers, local leaders and outreach workers; held meetings in clinics, schools, mosques, churches, and town halls; and conducted family planning IEC campaign weeks, which included meetings and traditional folk media. Evaluation results show that between November 1992 and September 1993 contraceptive prevalence in Minya increased from 22% to 30%.

Bolivia: Maternal health care was one of the main foci of Bolivia's National Reproductive Health Program mass media campaign which ran from April through November 1994. The campaign promoted reproductive health services through a series of radio and television spots featuring family planning, birth spacing, pre- and postnatal care, safe delivery and breastfeeding. The intended audience included women and men of middle and lower socioeconomic status between ages 18 and 35. An evaluation study conducted to assess the effectiveness of the campaign revealed that 85 percent of the study respondents had been exposed to the campaign. Increased awareness of family planning methods and sources was one of the most important results of the NHRP campaign. In the four main cities, the number of respondents citing television as their source of reproductive health information increased from 24 percent to 66 percent.

Zimbabwe: Zimbabwe's National Family Planning Council initiated a three year Male Motivation Project in 1988 - the objectives being - increasing knowledge of family planning methods among men of reproductive age, promoting more favorable attitudes about family planning, and increasing use of modern methods and promoting male involvement and joint decision-making between spouses about contraception and family size. The Male Motivation Campaign sought to achieve these objectives through three main activities: a radio drama series, educational talks for men, and pamphlets on family planning. An evaluation study revealed that spontaneous awareness of modern methods of family planning was significantly higher in men exposed to the campaign. There were also significant differences in how family planning decisions were made : men exposed to the campaign were more 2.37 times more likely to decide to practice family planning and were 1.35 times more likely to express an opinion that family size should be a joint decision than for men who were not exposed to the campaign, controlling for other factors.

Source: Center for Communication Programs / Johns Hopkins University.

## ENDNOTES

- <sup>1</sup> Preliminary results of the 1994 Census of the Republic of Yemen.
- <sup>2</sup> These assumptions are based on the *Yemen Public Expenditure Review*, 1996.
- <sup>3</sup> Preliminary results of the 1994 Census of the Republic of Yemen.
- <sup>4</sup> Based on indirect mortality estimates from YDMCHS 1991/92. Recent official estimates indicate a direct infant mortality of 81 per 1000 live births. Direct mortality estimates, which rely on mother's reporting of specific dates, tend to underestimate infant mortality especially in environment with low female literacy levels.
- <sup>5</sup> Republic of Yemen: Poverty Assessment (Report No.: 15158-YEM), World Bank, 1996 and YDMCHS 1991/92.
- <sup>6</sup> Yemen Public Expenditure Review, 1996.
- <sup>7</sup> Williamson J.F. and Higgins M, "The accumulation and demographic connection in East Asia" presented at the Conference on Population and the Asian Economic Miracle in January, 1997.
- <sup>8</sup> Population and Environment, National Population Council Conference Paper, 1996.
- <sup>9</sup> Based on 1973 census in South & East Governorates and 1975 census in North & West Governorates.
- <sup>10</sup> The number of women between 15-49 would almost triple in size by 2020 if the present trend continues.
- <sup>11</sup> This is based on the Rapid Model for Yemen (John Freymann, The Futures Group and NPC).
- <sup>12</sup> 72 percent for males and 17 percent for females.
- <sup>13</sup> The water issue and available policy options have been extensively discussed in the report 'Yemen: Towards a water strategy, Report No. 15178-YE, World Bank, 1996'.
- <sup>14</sup> These are biological and behavioral variables that directly affect fertility described by Bongaarts and modified by Hill for use in the Arab world.
- <sup>15</sup> The 1994 census supports this evidence as the female mean age at first marriage is currently around 20 years
- <sup>16</sup> A four-stage process of demographic development, consisting of: stage 1 - high fertility and high mortality resulting in low population growth; stage 2 - high fertility and declining mortality, resulting in accelerated population growth; stage 3 - declining fertility and declining to low mortality, resulting in deceleration of population growth; stage 4 - low fertility and low mortality, resulting in low population growth.
- <sup>17</sup> Age 25 to 29 cohort.
- <sup>18</sup> John Bongaarts, "Population Policy Options in the Developing World", Working Paper No. 59, The Population Council, 1994.
- <sup>19</sup> In this paper, excess fertility is defined as unwanted births.
- <sup>20</sup> Ideal family size is assumed here to be attained by having the ideal number of children based on women's expressed fertility preferences in the YDMCHS 1991/92.
- <sup>21</sup> To correctly account for the 29% of non-numerical or missing responses in determining the true desired family size of women, more sophisticated statistical techniques will be required.
- <sup>22</sup> See annexes 6 and 7 for details
- <sup>23</sup> Greater welfare benefits (such as a greater reduction in infant mortality) could be achieved if more resources are invested in the social sectors. However, care must be taken to ensure that such investments are sustainable in the macroeconomic context.
- <sup>24</sup> Maternal health services will include antenatal care, delivery management, postnatal care and counseling for nutrition, breastfeeding and weaning.
- <sup>25</sup> A high risk pregnancy is defined as one in which the woman is less than 20 years of age or over 35 years, parity is greater than five and/or birth interval is less than two years.
- <sup>26</sup> Based on YDMCHS 1991/92.
- <sup>27</sup> "Towards gender equality: the role of public policy", World Bank, 1995.
- <sup>28</sup> Women have a biological health advantage which is usually reflected in 6-8 year difference in life expectancy between females and males in industrial nations. In the Middle East and North Africa (MENA), the average regional difference is 3 years.
- <sup>29</sup> UNICEF(1994), "Master Plan of Operations for UNICEF program assistance to Republic of Yemen 1994-1998," UNICEF, 1994.
- <sup>30</sup> The proportion of difficult deliveries which occur in hospital is unknown. Therefore, it is not possible to determine if all the Cesarean Sections performed are necessary.

- <sup>31</sup> Distinction between private and public sector is blurred as most of the private sector consists of civil servants engaging in private practice in the afternoons.
- <sup>32</sup> The ongoing household health utilization survey being conducted by the World Bank should provide some information.
- <sup>33</sup> Yemen Health Sector Strategy Note, World Bank, 1996.
- <sup>34</sup> Field interviews in Ibb and Dhamar governorates and the Republic of Yemen Poverty Assessment, (Report No. 15158-YEM), World Bank, 1996.
- <sup>35</sup> This is a complex issue and manpower issues should be carefully reviewed as suggested in Annex 8.
- <sup>36</sup> As recommended in the Yemen Public Expenditure Review, World Bank, 1996.
- <sup>37</sup> Qat has been linked with low birth weight infants with high mortality (Annex 10).
- <sup>38</sup> Joshi, A. R., "Maternal schooling and child health: a preliminary analysis of the intervening mechanisms in rural Nepal," Health Transition Review 4(1): 1-26, 1995.
- <sup>39</sup> National Population Strategy, 1996. This is very optimistic as it would require a rise in rural female enrollment rates from 34.5 percent in 1994 to 90 percent in only ten years.
- <sup>40</sup> Republic of Yemen: Poverty Assessment, Report No. 15158-YEM, World Bank, 1996.
- <sup>41</sup> This is being addressed through the Yemen Basic Education Project financed by the World Bank. The project is also addressing the recruitment of female teachers in the rural areas and teacher training of rural women.
- <sup>42</sup> Other approaches include distance education, flexible hour schooling, double shift schools, vocational training etc.
- <sup>43</sup> Annual expenditure per student in 1994 was US\$84.
- <sup>44</sup> Republic of Yemen Poverty Assessment, Report No. 15158-YEM, World Bank, 1996.
- <sup>45</sup> "Population in developing countries: Implications for the World Bank", World Bank, 1994.
- <sup>46</sup> Calculated from YDMCHS 1991/92 data.
- <sup>47</sup> Low birthweight babies are four times more likely to die in infancy than average sized babies (YDMCHS 1991/92).
- <sup>48</sup> Based on Yemen Public Expenditure Review, 1996.

## ANNEXES

- Annex 1 CSO Population Projections
- Annex 2 Determinants of Fertility and Childhood Mortality and their Impact on Population Growth in Yemen
- Annex 3 Population Policy Options
- Annex 4 National Plan of Action of the Republic of Yemen
- Annex 5 Institutional Framework in the Population Sector
- Annex 6 Achieving the Ideal Family Size
- Annex 7 Population Action Program
- Annex 8 Data for Human Resources Development
- Annex 9 Community Organizations, NGOs and other Non Public Sector Program Mechanisms
- Annex 10 Qat and Population Dynamics
- Annex 11 Advocacy, Awareness and Information, Education and Communications (IEC)



